

# U.S.S.R. COMPUTATIONAL MATHEMATICS AND MATHEMATICAL PHYSICS

Cover-to-cover translation of  
*Zhurnal vychislitel'noi matematiki i matematicheskoi fiziki*

**LIST OF CONTENTS AND AUTHOR INDEX**  
**VOLUME 28, 1988**



**PERGAMON PRESS**

OXFORD · NEW YORK · BEIJING · FRANKFURT · SÃO PAULO · SYDNEY  
TOKYO · TORONTO

# U.S.S.R. COMPUTATIONAL MATHEMATICS AND MATHEMATICAL PHYSICS

Cover-to-cover translation of  
*Zhurnal vychislitel'noi matematiki i matematicheskoi fiziki*  
Russian Original Copyright  
Nauka, 90 Profsoyuznaya ul., Moscow 117485  
6 issues/annum

## SCIENTIFIC TRANSLATION EDITOR:

R. C. GLASS, M.A., M.Sc.,  
The City University, London

**Translators:** D. E. BROWN, R. C. GLASS, Z. LERMAN, D. LOUVISH, S. RHODES, E. L. SHORT  
and H. TURNER

**Publishing and Advertising Office:**  
Pergamon Press plc, Headington Hill Hall, Oxford, OX3 0BW, U.K.

## Subscription Rates

Annual Institutional subscription rate (1990) DM 2120.00

2-year Institutional rate (1990/91) DM 4028.00

Subscriptions are only serviced after payment has been received and  
are not accepted for less than one year. Prices are subject to change without notice.

Subscription enquiries from customers in America should be sent to:  
Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523, U.S.A.,  
and for the remainder of the world to:  
Pergamon Press plc, Headington Hill Hall, Oxford OX3 0BW, U.K.

## Microform Subscriptions and Back Issues

Back issues of Pergamon journals, both in hard copy and on microform,  
are available direct from Pergamon Press offices.

Copyright © 1990 Pergamon Press plc

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, electrostatic, magnetic tape, mechanical, photocopying, recording or otherwise, without permission in writing from the copyright holder.

**Photocopying information for users in the U.S.A.** The Item-fee Code for this publication indicates that authorization to photocopy items for internal or personal use is granted by the copyright holder for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service provided the stated fee for copying, beyond that permitted by Section 107 or 108 of the United States Copyright Law, is paid. The appropriate remittance of \$10.00 per copy per article is paid directly to the Copyright Clearance Center Inc., 27 Congress Street, Salem, MA 01970.

**Permission for other use.** The copyright owner's consent does not extend to copying for general distribution, for promotion, for creating new works, or for resale. Specific written permission must be obtained from the publisher for such copying.  
The Item-Fee Code for this publication is: 0041-5553/88 \$10.00 + .00

©<sup>TM</sup>The paper used in this publication meets the minimum requirements of American National Standard for Information Sciences—Permanence of Paper for Printed Library Materials, ANSI Z39.48-1984.

## VOLUME CONTENTS

VOL. 28, NO. 1

CONTENTS

1988

<p>A. B. BELYAYEV and I. S. MEN'SHIKOV</p> <p>M. M. AD'YUTOV and L. A. LEPIN</p> <p>A. V. BAYEV</p> <p>M. P. BELYANIN</p> <p>S. T. SIMAKOV</p> <p>S. A. GABOV and Yu. D. PLETTNER</p> <p>I. V. BELOVA and K. V. BRUSHLINSKII</p> <p>I. V. VOLKOV</p> <p>I. KH. ENIKEYEV, O. F. KUZNETSOVA, V. A. POLYANSKII and E. F. SHURGAL'SKII</p> <p>G. G. ELENIN, V. V. KRYLOV and N. V. SOSNIN</p> <p>M. GADOYEV</p> <p>S. V. BOGOMOLOV</p> <p>KH. D. IKRAMOV</p> <p>A. B. PEVNYI</p> <p>B. B. POKHODZEI</p> <p>YU. S. KOSOLAPOV</p> <p>A. A. CHARAKHCH'YAN</p> <p>YU. M. SEMENETS</p> <p>YU. R. BATYUK, M. S. SYAVAVKO and V. G. SHIBANOV</p> <p>V. D. VALEDINSKII and A. B. ISAKOV</p> <p>B. SH. MORDUKHOVICH</p> <p>M. K. ZAVRIYEVA</p> <p>N. M. NOVIKOVA</p> <p>V. V. POSPELOV</p> <p>U. LANGER</p>	<p><b>Translation of Number 1</b></p> <p>1 On compromise schemes in dynamic models of conflicting situations</p> <p>8 Selfsimilar solutions of the non-linear equation of heat conduction with distributed parameters in the case of constant heat conduction</p> <p>15 A method of solving the inverse scattering problem for the wave equation</p> <p>21 The asymptotic form in the one-dimensional model of some semiconductor devices</p> <p>34 A problem related to the oscillations of a compressible stratified liquid</p> <p>41 The problem of the oscillations of a flat disc in a stratified liquid</p> <p>47 A numerical model of the instability of a <i>Z</i>-pinch in a plasma of finite conductivity</p> <p>52 Gas-dynamic boundary conditions of slip on an uneven surface</p> <p>58 Mathematical modelling of two-phase twisted flows using a modified large-particle method</p> <p>66 The problem of the solution of a dense filtering layer of crystals</p> <p>74 Convergence of the method of particles for the three-dimensional system of Vlasov equations</p> <p>79 Convergence of the total-approximation method for the Boltzmann equation</p> <p><b>Short Communications</b></p> <p>85 Singular numbers and polar factorization of an operator in a bilinear metric space</p> <p>87 Optimality of the spline algorithm for finding the maximum of a class of functions of several variables</p> <p>91 The modelling of truncated distributions</p> <p>93 Numerical solution of the problem of the supersonic flow of a gas from a plane slit in hodograph variables</p> <p>97 The effect of false cumulation for Godunov's scheme on moving grids</p> <p>100 Basic kinetic equation for the rarefied gas model used in the statistical particle-in-cell method</p> <p>103 Rational approximations of the evolution operator</p> <p>104 On the difference analogue of the inequality <math>\ p\ L_2 \leq C \ \operatorname{grad} p\ W_2^{-1}\ </math> in spherical coordinates</p> <p><b>Translation of Number 2</b></p> <p>106 An approximate maximum principle for finite-difference control systems</p> <p>115 Convergence estimates for different versions of the penalty method of seeking a max-min with linked variables</p> <p>120 Stochastic methods for the numerical solution of convex variational inequalities</p> <p>127 A method of investigating the stability and accuracy of difference schemes</p> <p>135 A fast iterative method for solving the first biharmonic boundary-value problem</p>
--	---

- M. P. BELYANIN and A. B. VASIL'YEVA  
 YU. V. KOBYLINSKII, T. L. POPKOVA  
 and G. YA. SLEPYAN
- P. B. DMITRIYEV
- M. KH. STRELETS and M. L. SHUR
- A. V. BABAKOV
- A. M. CHEBOTARYEV
- G. P. PANASENKO
- B. V. ALEKSEYEV and S. A. USTYUGOV
- S. V. BOGOMOLOV
- AN. V. LUKSHIN and S. N. SMIRNOV
- V. A. VORONINA
- 145 On the interior transitional layer in a problem of semiconductor film theory  
 154 The method of non-orthogonal series for the numerical solution of problems of mathematical physics  
 161 The theory of capillary waves on the surface of a rotating liquid  
 165 Methods of scaling the compressibility in calculating stationary flows of a viscous gas at arbitrary Mach numbers  
 173 On the possibility of the numerical modelling of non-stationary vortex structures in a near wake
- Short Communications**
- 180 The fast Fourier transform in a problem with multiple grid-points  
 183 Numerical solution of cell problems in averaging theory  
 187 Numerical solution of the generalized equations of gas dynamics  
 190 Fluctuations of the method of particles for the Vlasov equation  
 192 On a stochastic method of solving the Boltzmann equation  
 196 A method for constructing a solution of the spatially homogeneous Boltzmann equation for a mixture of gases

---

VOL. 28, NO. 2

CONTENTS

1988

---

YU. M. KANIOVSKII

V. M. PANIN

A. I. KALININ

S. A. GABOV

V. F. BUTUZOV and A. B. VASIL'YEVA

A. A. OSIPOV and I. A. SHIRKOVSKII

L. S. KLABUKOVA and I. I. CHECHEL

YU. V. APANOVICH and E. D. LYUMKIS

V. A. PEREPELITSA and I. V. SERGIENKO

O. R. CHUYAN

E. A. KAZ'MINA

N. A. NEDASHKOVSKII

N. N. TRENEV

S. I. REPIN

N. A. DAR'IN and V. I. MAZHUKIN

YU. A. LEBEDEV and N. A. TIKHONOV

**Translation of Number 3**

- 1 The sufficient conditions for the convergence of the method of successive approximations with discontinuous functions  
 6 A linear method of finite penalties with regulated  $\epsilon$ -descent  
 12 Optimization of quasilinear control systems  
 19 The theory of interior waves when a free surface is present  
 26 The asymptotic theory of contrasting spatial structures  
 37 The use of the finite-element method to calculate acoustic fields in inhomogeneous gas flows  
 45 A variational-difference method for solving boundary-value problems in the theory of shells using Vekua's moment theory  
 57 Difference schemes for the Navier-Stokes equations on a net consisting of Dirichlet cells  
 63 A study of one class of integer multicriterion problems  
 76 The relationship between guaranteed results in sequential and non-sequential algorithms  
 82 Probabilistic semantics of terminating programs
- Short Communications**
- 88 Solution of systems of algebraic equations with  $\lambda$  matrices  
 92 Some algorithms for comparing partial solutions in distributed systems  
 96 A variational difference method for solving problems of ideal plasticity in which discontinuities may appear  
 99 An approach to adaptive grid construction for non-stationary problems  
 104 Mathematical modelling of the process of water purification in the ion-exchange filter of an industrial plant

A. S. ROMANOV	107 Comparison of solutions of the Cauchy problem for a class of integro-differential equations
A. ARTYKOV	110 An N-dimensional generalization of an initial boundary value problem that arises in the theory of internal waves
	111 Corrigenda
I. M. SOBOL	<b>Translation of Number 4</b>
	112 Determination of the extremal values of a function of several variables satisfying a generalized Lipschitz condition
I. P. BOGLAYEV	118 A numerical method for solving quasilinear elliptic equations with a small parameter for the highest derivatives
S. A. IVANENKO and A. A. CHARAKHCH'YAN	126 Curvilinear grids of convex quadrilaterals
G. L. SIGANEVICH	134 A version of the fictitious-domain method
YU. D. PLETNER	139 Gyroscopic gravitational waves caused by the oscillations of a straight section
A. A. TIKILYAINEN	146 A problem connected with the theory of planetary waves
F. V. BUNKIN, V. A. GALAKTIONOV, N. A. KIRICHENKO, S. P. KURDYUMOV and A. A. SAMARSKII	157 A non-linear boundary value problem of ignition by radiation
A. A. ARSEN'YEV	164 The approximation of the Boltzmann equation by stochastic equations
G. D. VASIL'KOV, I. I. EVSTIGNEYEV and M. E. ZHUKOVSKII	170 A procedure for calculating electromagnetic fields in a quasithree-dimensional model
M. A. KRAVTSOVA and A. I. RUBAN	177 Detachment of a supersonic boundary layer in front of the bottom edge of a contour of a body
O. S. RYZHOV and I. V. SAVENKOV	185 Spatial perturbations introduced by a harmonic oscillator in a boundary layer on a plate
V. K. DURAKOVA, V. A. NOVIKOV and E. A. NOVIKOV	<b>Short Communications</b>
S. A. GABOV and M. B. TVERSKOI	193 Explicit first-order Runge-Kutta methods with a given stability interval
V. B. MITROFANOV and A. KH. PERGAMENT	197 On the flow of a stratified fluid past an obstacle
A. V. PANYUKOV and B. V. PEL'TSVERGER	201 The EOS-2 system for processing X-ray pictures of a high-temperature laser plasma
	204 The optimal distribution of a tree in a finite set

A. I. MOISEYEV	<b>Translation of Number 5</b>
M. V. FEDORYUK	1 Computation of certain functions related to the Hurwitz zeta-function
O. R. MEN'SHIKOVA and V. V. PODINOVSKII	7 The asymptotic form of radial Lamé wave functions
S. A. NEKRASOV	15 Constructing the preference relation and the core in multicriterion problems with inhomogeneous criteria ordered by importance
YU. N. MOKIN	23 The construction of two-sided approximations to the solution of a Cauchy problem
V. F. BUTUZOV and L. V. KALACHEV	29 Direct and iterative methods for solving the integral equations of potential theory
	39 Asymptotic behaviour of the solution of the problem of combustion in the case of an autocatalytic reaction

G. G. ELENIN and E. S. KURKINA

G. T. GOLOVIN

V. A. GASILOV, S. F. KRYLOV,  
O. S. SOROKOVKOVA and S. I. TKACHENKO

M. V. KHAZANOV

A. P. FILIPPOVICH

YU. L. LEVITAN, N. I. MARKOVICH,  
S. G. ROZIN and I. M. SOBOL

I. O. YAROSHCHUK

A. V. LUKSHIN and S. N. SMIRNOV

V. A. VORONINA

O. I. ZVAROVA

R. K. TAGIYEV

S. L. BLYUMIN, YU. I. DENISENKO  
and S. P. MILOVIDOV

V. YA. ARSENIN, YU. A. KRIKSIN  
and A. A. TIMONOV

A. YU. VERETENNIKOV

I. M. ISLAMOV

O. V. LEVCHUK and A. M. FEDOTOV

E. A. VOLKOV

V. A. GALAKTIONOV and S. A. POSASHKOV

G. A. BIRNOVSKII

A. L. GONCHAROV and I. V. FRYAZINOV

YU. A. EREMIN and A. G. SVESHNIKOV

S. YU. KOVENSKII and A. V. TIKHONRAVOV

I. N. KOLYSHKIN, A. YA. ENDER  
and I. A. ENDER

YU. V. KNYAZIKHIN

T. G. ELIZAROVA

48 The multiplicity of stationary states in one non-ideal model of a heterogeneous catalytic reaction

55 A method of analysing steady-state relativistic beams in long diodes

62 The application of fully conservative difference schemes to the calculation of two-dimensional magnetohydrodynamic systems

71 A method for the numerical solution of the one-dimensional hydrodynamic equations of a two-phase gas-liquid mixture

79 Analysis of mixed schemes of the finite element method in problems of the deformation of shallow shells

#### Short Communications

88 On quasirandom sequences for numerical computations

92 A method for the numerical modelling of waves in a one-dimensional non-linear medium with random inhomogeneities

96 A stochastic algorithm for solving the Boltzmann equation based on Euler's method

99 A method of constructing the solution of the system of Boltzmann equations for reacting gases

104 The properties of the collision integrals in the Boltzmann equation of semiconductor theory

108 Convergence of difference approximations and regularization of the optimal control problem for an ordinary linear differential equation of the second order

#### Translation of Number 6

109 Investigation and solution of integer systems of linear equations

113 A local regularization method for linear operator equations of the first kind and its applications

125 The mean-square convergence of stochastic iterative procedures in ill-posed problems

129 Asymptotic regularization of an ill-posed identification problem

136 Construction of minimax solutions of linear ill-posed problems with random errors in the data

143 Approximate conformal mapping by the block method of a circle with a polygonal hole into a ring

148 A method of investigating unbounded solutions of quasilinear parabolic equations

156 On optimal control of multiphase porous flow in an oil bed

164 Difference schemes on a nine-point "cross" pattern for solving the Navier-Stokes equations

172 The use of conjugate equations in the method of auxiliary sources

178 Synthesis of absorbing layered media

187 Numerical solution of isotropic relaxation problems by the method of Maxwellian expansion

198 Seidel's method for the transport equation with anisotropic scattering in  $R^3$

205 Boundary conditions for kinetically consistent difference schemes in gas dynamics

A. B. BAKUSHINSKII, A. V. GONCHARSKII  
and S. YU. LEVITAN

A. S. BARASHKOV

V. I. ZHUK

P. I. KAPITANETS and V. V. LUNEV

A. M. STERLIN

N. V. POGORELOV

V. I. VYSOTSKII, R. N. KUZ'MIN  
and N. P. SAVENKOVA

**Short Communications**

- 210 Fast linear iterative algorithms of image restoration  
214 On the uniqueness of quasisolutions of operator equations  
216 On the current in a free interaction region near a permeable wall portion  
219 The shock-characteristic method for solving discontinuous problems in  
gas dynamics  
223 Generalization of the interior modified Lagrange function for the solution  
of the general mathematical programming problem  
225 Similarity transformations of matrices in the stationary equations of  
gas-dynamics  
226 Numerical analysis of the orientational motion of neutral particles in  
crystals

VOL. 28, NO. 4

**CONTENTS**

1988

A. M. FEDOTOV

V. V. VASIN

A. L. ALIMOV

S. L. UTKIN, V. R. KHACHATUROV  
and H. TUY

SH. I. GALIYEV

G. B. RUBAL'SKII

G. G. MALINETSKII and A. B. POTAPOV

V. A. KAZAKOV

L. S. KLABUKOVA

M. S. IVANOV and S. V. ROGAZINSKII

V. A. GAL'BURT, M. F. IVANOV  
and O. A. RYABOV

V. P. BASS and V. I. BRAZINSKII

B. HOFMANN

K. N. BELASH and A. A. TRET'YAKOV

A. P. CHERENKOV

U. G. ABDULLAYEV and A. D. ISKENDEROV

P. N. ZHEVANDROV

A. M. LEVIN

**Translation of Number 7**

- 1 Construction of optimal solution procedures for operator equations  
6 Iterative methods for solving ill-posed problems with *a priori* information  
in Hilbert spaces  
13 A method of data compression for the digital correction of the readings  
of a measuring system  
20 Conical algorithms for solving a concave programming problem and some  
generalizations  
25 Numerical solutions of minmaxmin problems  
33 The halving method in the hole-filling problem  
39 On calculating the dimension of strange attractors  
50 An approach to using *B* splines in splitting schemes to solve the  
Navier-Stokes equations  
56 A variational difference method for solving problems of infinitesimal  
deformations of a surface of positive curvature  
63 Comparative analysis of direct simulation algorithms in rarefied gas  
dynamics  
72 On a method for calculating non-equilibrium gas-dynamic flows while  
simultaneously taking account of ionization and radiation transport  
77 Numerical algorithms for computing mass-transfer processes in a highly  
rarefied gas

**Short Communications**

- 88 A control algorithm for a multiparameter regularization process  
90 Methods for solving degenerate problems  
95 The allocation of different types of resources with saturation  
100 The well-posed nature of the problem of determining an unknown  
boundary of a domain in a similarity regime  
102 Ship waves on the surface of a floating liquid  
107 **Translation of Number 8**  
Modification of Newton's and the secants methods and their applications  
in regularizing algorithms

A. YU. YEREMIN, I. E. KAPORIN and M. K. KERIMOV	115 Computation of the derivatives of the Riemann zeta-function in the complex domain
A. A. EGORUSHKIN, N. B. ZYABREV and A. N. TIKHONOV	125 A multifactor problem of non-linear programming with a decreasing input function
YU. B. LIFSHITS and A. A. SHAGAYEV	134 A mesh-projection scheme for computing transonic flow past an aerofoil
A. ZEMLA	143 Lattice approximations of the Helmholtz equation in a singularly-perturbed region
E. N. BULANZHE	151 Qualitative analysis of a dynamic model of a resource-limited age distribution
A. S. IL'INSKII and A. F. KADOMTSEVA	159 Application of the method of finite elements to the problem of the propagation of waves in an irregular waveguide
N. A. DAR'IN, V. I. MAZHUKIN and A. A. SAMARSKII	164 A finite-difference method for solving the equations of gas dynamics using adaptive nets which are dynamically associated with the solution
V. A. BRAILOVSKAYA and V. R. KOGAN	175 A method of computing periodic vortical currents of an incompressible fluid
A. P. BYRKIN and A. I. TOLSTYKH	180 Compact third- and fourth-order schemes in problems concerning internal flows of viscous and non-viscous gases
<b>Short Communications</b>	
M. S. NIKOL'SKII	192 A method of approximating an attainable set for a differential inclusion
D. D. BUREV	194 Discrete analytical solution of a smooth non-linear optimal control problem
A. N. ERMILOV, V. I. KABANOVICH and A. M. KURBATOV	197 Analytic representation of Green's function for a finite-difference Laplace equation
K. V. MAL'KOV	198 Stabilization of the solutions of a certain non-linear integrodifferential kinetic equation
S. V. BOGOMOLOV and V. A. LEBEDEV	202 Convergence of a difference scheme for solving a system of partial differential equations of the particle method for the Boltzmann equation
I. KH. SIGAL	205 An algorithm for the approximate solution of a large-scale travelling salesman problem in a plane

---

VOL. 28, NO. 5

CONTENTS

1988

---

L. N. BONDARENKO and P. F. ZHUK	Translation of Number 9
L. T. POZNYAK	1 Combined iterative methods of the variational type
P. B. DMITRIYEV	11 An estimate of the rate of convergence of Weinstein's method in the eigenvalue problem for an L-shaped membrane
YU. V. KNYAZIKHIN	20 Diffraction of a plane wave by a half-plane in a rotating liquid taking capillary forces into account
G. I. LAPTEV	27 On a class of iteration methods in linear transport theory
I. G. NEUDACHIN, V. A. PODDUBNYI and B. T. PORODNOV	35 Mathematical features of the problem of the penetration of a magnetic field into matter
S. G. PONOMAREV, V. G. PRIIMAK and B. L. ROZHDESTVENSKII	45 Some applications of the Boltzmann equation in problems of gas dynamics
A. A. OSIPOV and K. S. REYENT	50 Statistically stationary solutions of the Navier-Stokes equations in an annular channel. Hydrodynamic characteristics and space-time structure
	59 A method of integral equations for calculating the non-stationary aerodynamic characteristics of a rotating blading ring

V. I. DONSKOI	66 Weakly determinate problems of Boolean linear programming with a partially specified set of admissible solutions
O. L. CHERNYKH	71 Construction of the convex hull of a finite set of points when the computations are approximate
N. N. KATERINOCHKINA	78 Finding a maximal zero for some classes of monotone Boolean functions in Post's classification
V. A. GURVICH, A. V. KARZANOV and L. G. KHACHIVAN	85 Cyclic games and an algorithm to find minimax cycle means in directed graphs
V. A. STRIZHKOV	<b>Short Communications</b>
A. I. ZHDANOV	91 The well-posedness of potential-type Fredholm integral equations of the first kind for thin wires
S. A. IVANOV, V. P. KORNEYEV and Y. LANG	93 The solution of ill-posed stochastic linear algebraic equations by the maximum likelihood regularization method
K. V. KUDAKOV and S. V. TROFIMOV	97 Estimates of constants in inequalities for basis elements
V. I. KOROBOV	102 An algorithm for synthesizing correct recognition procedures for problems with non-intersecting classes
L. V. BABUSHKINA, M. K. KERIMOV and A. I. NIKITIN	<b>Translation of Number 10</b>
A. I. GOLIKOV and G. G. KOTKIN	105 Regularization of extremal eigenvalues in the symmetric generalized problem
V. K. LEONT'YEV and K. KH. MAMUTOV	109 Algorithms for computing Bessel functions of half-integer order with complex arguments
YU. G. BULYCHEV	117 Characterization of the optimal set of the multicriterion optimization problem
S. V. ERSHOV and G. G. MALINETSII	126 Stability of solutions in problems of Boolean linear programming
S. A. IVANENKO	130 A method of integral support curves for solving the Cauchy problem for ordinary differential equations
S. A. GABOV	136 The solution of the inverse problem for the Perron-Frobenius equation
F. P. VASILIYEV, B. G. KAGANOV, D. P. KOSTOMAROV and V. I. KUKULIN	141 Generation of non-degenerate meshes
V. B. GLASKO, B. N. NYUNIN, A. N. TIKHONOV and M. K. TRUBETSKOV	147 On the existence of steady waves of finite amplitude on the surface of a floating liquid
A. V. GONCHARSKII, M. V. KLIBANOV and V. V. STEPANOV	155 The penalty function method for solving many-particle quantum-mechanical problems
S. M. PONOMAREV	162 The problem of reducing the acoustic roar in the passenger compartment of an automobile
V. A. APARINOV, S. M. BELOTSERKOVSKII, I. K. LIFANOV and A. A. MIKHAILOV	169 Inverse problems of coherent optics. The use of the stationary phase method in problems of focussing radiation onto a curve
O. I. ZVAROVA and A. V. LUKSHIN	177 Exact solutions of the equations of non-linear diffusion of a magnetic field
A. V. KNYAZEV and A. L. SKOROKHODOV	182 Calculation of the non-stationary aerodynamic characteristics of a body in the case of separated flow
A. B. SAMOKHIN	188 The approximation of the Boltzmann equation of semiconductor theory by stochastic equations
M. V. NOSKOV	<b>Short Communications</b>
	195 The rate of convergence of the method of steepest descent in a Euclidean norm
	196 A simple iterative method for solving linear operator equations
	200 Cubature formulae for the approximate integration of functions of three variables

V. G. ZHADAN

**Translation of Number 11**

1 An augmented Lagrange function method for multicriterion optimization problems

A. V. BAYEV

11 On the solution of the inverse boundary value problem for the wave equation with a discontinuous coefficient

N. A. FARKOVA

22 The use of Faber polynomials to solve systems of linear equations

G. I. SHISHKIN

32 A difference scheme for a singularly perturbed equation of parabolic type with discontinuous boundary conditions

S. I. SMAGIN

41 Numerical solution of the integral equation of the first kind with a weak singularity for the density of a simple layer potential

V. P. GERDT, A. YU. ZHARKOV,  
S. I. SVINOLUPOV and A. B. SHABAT

50 The use of computer algebra to investigate the integrability of non-linear evolution systems

V. V. VARLAMOV

57 The Cauchy problem for the equation describing acoustic waves in a medium with dispersion

T. G. ELIZAROVA and  
B. N. CHETVERYUSHKIN

64 Kinetically coordinated difference schemes for modelling flows of a viscous heat-conducting gas

E. I. ANDRIANKIN, V. A. ANDRUSHCHENKO  
and N. N. KHOLIN

75 A numerical technique for solving non-stationary spatial problems of the dynamics of elastoplastic media

A. V. DEMIN, V. A. KOROBITSYN,  
A. I. MAZURENKO and A. I. KHE

81 Calculation of the flows of a viscous incompressible liquid with a free surface on two dimensional Lagrangian nets

V. N. PAUTOV and A. M. FRANK

**Short Communications**

88 An algorithm for constructing Dirichlet meshes for time-dependent problems based on local rearrangements

V. A. NEGANOV and E. I. NEFEDOV

92 Estimating the accuracy of approximate solutions of singular integral equations for the normal modes of strip and slotted structures

G. S. PALUBETSKIS

97 A generator of test quadratic assignment problems with known optimal solution

G. A. IL'YUSHINA

99 Mathematical modelling in the mechanics of continuous media

YU. D. SHMYGLEVSKII

103 Inversion of a singularity of the Navier-Stokes equations

M. B. AIDARKHANOV

105 An approach to analysing the initial information in pattern recognition problems

V. N. MEL'NIK and M. N. MOSKAL'KOV

109 On the coupled non-stationary electro-elastic oscillations of a piezo-ceramic cylinder with radial polarization

A. A. KONSTANTINOV, V. P. MASLOV  
and A. M. CHEBOTAREV**Translation of Number 12**

111 Shift of the boundary conditions for partial differential equations

L. V. BABUSHKINA, M. K. KERIMOV  
and A. I. NIKITIN

122 Algorithms for evaluating spherical Bessel functions in the complex domain

YU. A. KRYSOV

129 Consistency and stability of aggregation in parametric mathematical programming problems

V. S. IZHUTKIN and M. Yu. KOKURIN	135 Reduced-direction methods for the non-linear programming problem
S. A. VOLOSHIN	146 On non-local implicit schemes
A. S. BARASHKOV	152 Asymptotic forms of the solution of the inverse problem for the Helmholtz equation
S. A. GABOV and M. B. TVERSKOI	159 Investigation of the linear equations of the dynamics of a compressible stratified fluid
P. A. KRUTITSKII	166 Small non-stationary vibrations of vertical plates in a channel with a stratified liquid
V. A. GONCHAROV, V. M. KRIVTSOV and A. A. CHARAKHCH'YAN	177 A numerical simulation scheme for subsonic flows in a viscous compressible gas
S. V. KULIKOV and M. E. SOLOV'YEVA	183 The efficiency of the statistical modelling of a shock wave in a gaseous mixture
V. B. KARAMYSHEV and V. M. KOVENYA	188 The predictor-corrector method for solving problems of gas dynamics
V. I. NAIDENOV	194 On the non-linear equations of the selfsimilar motion of a viscous fluid
<b>Short Communications</b>	
KH. D. IKRAMOV	203 Undecomposable Hamiltonian matrices with pure imaginary spectrum
B. B. POKHODZEI	207 A note on beta-methods for simulating binomial distributions
A. O. ALEKSEYEV, O. G. ALEKSEYEV, V. D. KISELEV and G. P. MIROVITSKII	208 An experimental estimate of the effectiveness of using duality to solve discrete programming problems
A. I. ZEIFMAN	210 Truncation error in a birth and death system
S. I. PISKAREV	211 A method of increasing the accuracy of the solution of initial problems in Banach space

